

Form 1449 (Modified)

**Information Disclosure
Statement By Applicant**

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Atty Docket No.:
IMM1P021A

Serial No.:
09/106,565

Applicant: Kenneth M. Martin et al.

Filing Date: 6/29/98

Group 2837

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
<i>h</i>	A	5,629,594	5/13/97	Jacobus et al.	318	568.11	10/16/95
<i>h</i>	B	5,459,382	10/17/95	Jacobus et al.	318	568.11	6/9/94
<i>h</i>	C	5,512,919	4/30/96	Araki	345	156	3/30/93
<i>h</i>	D	5,623,582	4/22/97	Rosenberg	395	99	7/14/94
<i>h</i>	E	5,625,576	4/29/97	Massie et al.	364	578	10/1/93
<i>h</i>	F	5,405,152	4/11/95	Katanics et al.	273	438	6/8/93
<i>h</i>	G	5,414,337	5/9/95	Schuler	318	561	6/11/93
<i>h</i>	H	5,289,273	2/22/94	Lang	348	121	11/5/92
<i>h</i>	I	5,220,260	6/15/93	Schuler	318	561	10/24/91
<i>h</i>	J	5,143,505	9/1/92	Burdea et al.	414	5	2/26/91
<i>h</i>	K	5,116,051	5/26/92	Moncrief et al.	273	448 B	6/8/90

Foreign Patent or Published Foreign Patent Application

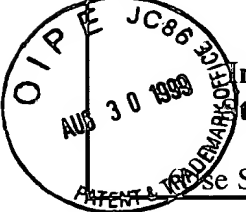
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
<i>h</i>	L	WO9532459	30.11.95	PCT			X	
<i>h</i>	M	WO9520787	03.08.95	PCT			X	
<i>h</i>	N	WO9520788	03.08.95	PCT			X	
<i>h</i>	O	WO9502233	19.01.95	PCT			X	
<i>h</i>	P	WO9616397	05.30.96	PCT			X	

Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>h</i>	R	Burdea et al., "Dextous telerobotics with force feedback-an overview. Part 1: Human factors", Rutgers-The State University of New Jersey, Dept. of Electrical and Computer Engineering, Piscataway, NJ, June 22, 1990.
<i>h</i>	S	Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Transactions on Systems, Man, and Cybernetics, Vol. 21, 3, 1991 IEEE.
<i>h</i>	T	Ellis, et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface", DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces ASME 1993.
Examiner <i>Kenneth M. Martin</i>		Date Considered <i>12/15/98</i>

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Form 1449 (Modified) 	Information Disclosure Statement By Applicant Use Several Sheets if Necessary) 2		Atty Docket No.: IMM1P021A	Serial No.: 09/106,565
	Applicant: Kenneth M. Martin et al.		Filing Date: 6/29/98 Group 2837	

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
<i>u</i>	A	4,888,877	12/26/89	Enderle et al.	33	559	5/9/88
<i>u</i>	B	4,791,934	12/20/88	Brunnett	128	653	8/7/86
<i>u</i>	C	4,638,798	1/27/87	Shelden et al.	128	303 B	9/10/80
<i>u</i>	D	4,550,617	11/5/85	Fraignier et al.	73	862.04	5/4/84
<i>u</i>	E	4,448,083	5/15/84	Hayashi	73	862.04	4/5/82
<i>u</i>	F	4,436,188	3/13/84	Jones	188	378	11/18/81
<i>u</i>	G	3,875,488	4/1/75	Crocker et al.	318	648	2/15/73
<i>u</i>	H	3,795,150	3/5/74	Eckhardt	74	5.4	12/13/72
<i>u</i>	I	4,477,043	10/16/84	Repperger	244	223	12/15/82
<i>u</i>	J	3,490,059	1/13/70	Paulsen et al.	73	133	6/6/66
<i>u</i>	K	2,906,179	9/29/59	Bower			1/28/57

Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
<i>u</i>	L	WO9622591	07.25.96	PCT			X	
<i>u</i>	M	WO9502801	26.01.95	PCT			X	
<i>u</i>	N	WO9426167	24.11.94	PCT			X	
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>u</i>	R	Hasser, "Tactile Feedback for a Force-Reflecting Haptic Display", University of Dayton, Dayton, Ohio, Decemer 1995.
<i>u</i>	S	Adelstein, et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research", NASA-Ames Research Center, Moffett Field, CA, 1992.
<i>u</i>	T	IWATA, "Volume Haptization", Institute of Engineering Mechanics, University of Tsukuba, Tsukuba, Japan, IEEE 1993
Examiner	<i>Kan Masuda</i> Date Considered <i>12/15/99</i>	

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Filing Date: 6/29/98 Group 2837

OIPE JC86-321
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 PATENT & TRADEMARK OFFICE

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
<i>JK</i>	A	4,653,011	3/24/87	Iwano	364	513	3/27/85
<i>JK</i>	B	4,676,002	6/30/87	Slocum	33	1 MP	12/20/85
<i>JK</i>	C	4,679,331	7/14/87	Koontz	33	551	8/26/85
<i>JK</i>	D	4,688,983	8/25/87	Lindbom	414	735	5/21/84
<i>JK</i>	E	4,703,443	10/27/87	Moriyasu	364	559	2/7/85
<i>JK</i>	F	4,750,487	6/14/88	Zanetti	128	303 B	11/24/86
<i>JK</i>	G	3,944,798	3/16/76	Eaton	235	151.3	4/18/74
<i>JK</i>	H	4,216,467	8/5/80	Colston	340	365 L	12/22/77
<i>JK</i>	I	4,571,834	2/25/86	Fraser et al.	33	1 PT	5/16/85
<i>JK</i>	J	4,593,470	6/10/86	Davies	33	1 CC	8/13/84
<i>JK</i>	K	4,803,413	2/7/89	Kendig et al.	318	648	7/15/86

Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
<i>JK</i>	L							
<i>JK</i>	M							
<i>JK</i>	N							
<i>JK</i>	O							
<i>JK</i>	P							

Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>JK</i>	R	Howe, "Task Performance with a Dextrous Teleoperated Hand System", Harvard University, Division of Applied Sciences, Cambridge, MA 02138, Presented at "Telemanipulator Technology 32, Proceedings of SPIE, Vol 1833, 1992.
<i>JK</i>	S	Snow et al., "Compact Force-Reflecting Hand Controller", Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 1991.
<i>JK</i>	T	McAfee, "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual", Jet Propulsion Laboratory, California Institute of Technology, 1988.
Examiner <i>JK</i>	Date Considered <i>12/15/99</i>	

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U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
<i>km</i>	A	4,800,721	1/31/89	Cemenska et al.	60	393	2/13/87
	B	4,811,608	3/14/89	Hilton	73	862.04	11/6/86
	C	4,891,889	1/9/90	Tomelleri	33	503	5/2/88
	D	4,907,970	3/13/90	Meenen Jr.	434	45	3/30/88
	E	4,907,973	3/13/90	Hon	434	262	11/14/88
	F	4,961,267	10/9/90	Herzog	33	503	11/23/88
	G	4,982,504	1/8/91	Soderberg et al.	33	502	2/17/89
	H	5,142,931	9/1/92	Menahem	74	471 XY	2/14/91
	I	5,007,300	4/16/91	Siva	74	471 XY	1/22/90
	J	5,050,608	9/24/91	Watanabe et al.	128	653 R	9/4/90
<i>km</i>	K	5,103,404	4/7/92	McIntosh	318	568.22	12/20/89

Foreign Patent or Published Foreign Patent Application

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							Yes	No
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Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>lh</i>	R	Schmult, "Application Areas for a Force-Feedback Joystick", DSC-Vol 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993.
<i>lh</i>	S	Winey III, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle control", Massachusetts Institute of Technology, 1981.
<i>lh</i>	T	Russo, "The Design and Implementation of a Three Degree-of-Freedom Force Output Joystick", Department of Mechanical Engineering, 1990.
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 AUG 30 1999
 PATENT & TRADEMARKS

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
lw	A	5,148,377	9/15/92	McDonald	364	560	12/10/87
lw	B	5,184,306	2/2/93	Erdman et al.	364	474.05	12/20/91
	C	5,184,319	2/2/93	Kramer	364	806	2/2/90
	D	5,187,874	2/23/93	Takahashi et al.	33	502	4/27/90
	E	5,189,806	3/2/93	McMurtry et al.	33	503	8/17/92
	F	5,379,663	1/10/95	Hara	74	471 XY	11/22/93
	G	5,223,776	6/29/93	Radke et al.	318	568.1	12/31/90
	H	5,228,356	7/20/93	Chuang	74	471 XY	11/25/91
	I	5,230,623	7/27/93	Guthrie et al.	433	72	12/10/91
	J	5,243,266	9/7/93	Kasagami et al.	318	568.1	7/2/92
✓	K	5,251,127	10/5/93	Raab	364	413.13	7/31/90

Foreign Patent or Published Foreign Patent Application

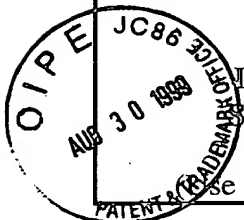
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
lw	R	Hiroo Iwata, "Pen-based Haptic Virtual Environment", Institute of Engineering Mechanics, University of Tsukuba, Tsukuba, Japan.
lw	S	J.N. Herndon, "The State-of-the-Art Model M-2 Maintenance System", Proc. of the 1984 Natinal Topical Meeting on Robotics and Remote Handling in Hostile Environment, American Nuclear Society, pp. 147-154.
lw	T	Minsky, et al., "Feeling and Seeing: Issues in Force Display", Dept. of Computer Science, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, ACM 1990.
Examiner <i>Kenneth M. Martin</i>		Date Considered <i>12/15/99</i>

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U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
<i>lu</i>	A	5,259,120	11/9/93	Chapman et al.	33	502	7/20/92
<i>lu</i>	B	5,296,846	3/22/94	Ledley	345	161	10/5/92
<i>lu</i>	C	5,389,865	2/14/95	Jacobus et al.	318	568.11	12/2/92
<i>lu</i>	D	5,397,323	3/14/95	Taylor et al.	606	130	10/30/92
<i>lu</i>	E	5,402,582	4/4/95	Raab	33	503	2/23/93
<i>lu</i>	F	5,412,880	5/9/95	Raab	33	503	8/26/93
<i>lu</i>	G	5,436,542	7/25/95	Petelin et al.	318	567	1/28/94
<i>lu</i>	H	5,445,166	8/29/95	Taylor	128	897	4/6/94
<i>lu</i>	I	5,576,727	11/19/96	Rosenberg et al.	345	179	6/5/95
<i>lu</i>	J	5,185,561	2/9/93	Good et al.	318	432	7/23/91
<i>lu</i>	K	4,775,289	10/4/88	Kazerooni	414	735	9/25/87

Foreign Patent or Published Foreign Patent Application

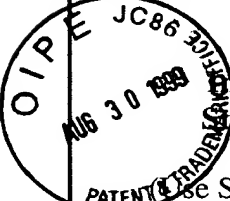
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
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	O							
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Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>lu</i>	R	Batter, et al., "Grove-1: A Computer Display to the Sense of Feel", University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA
<i>lu</i>	S	Gotow, et al., "Perception of Mechanical Properties at the Man-Machine Interface", Dept. of Mechanical Engineering and The Robotics Institute, Carnegie Mellon University, Pittsburgh, PA 15213
<i>lu</i>	T	Atkinson, et al., "Computing with Feeling", University of California, San Diego, Department of Chemistry, 1976.
Examiner	Date Considered	
<i>Kenn Martin</i>	<i>12/5/99</i>	

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U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
✓	A	5,642,469	6/24/97	Hannaford et al.	395	99	11/3/94
✓	B	5,587,937	12/24/96	Massie et al.	364	578	4/25/95
✓	C	3,919,691	11/11/75	Noll	340	172.5	5/26/71
✓	D	4,962,448	10/09/90	DeMaio et al.	364	146	9/30/88
✓	E	5,146,566	09/08/92	Hollis, Jr. et al.	395	275	05/29/91
✓	F	5,156,363	10/20/92	Cizewski et al.	244	223	02/28/91
✓	G	5,193,963	03/16/93	McAfee et al.	414	5	10/31/90
✓	H	5,235,868	08/17/93	Culver	74	471	10/02/91
✓	I	5,491,477	02/13/96	Clark et al.	341	20	09/13/93
✓	J	5,691,898	11/25/97	Rosenberg et al.	364	190	03/28/96
✓	K	5,709,219	01/20/98	Chen et al.	128	782	08/01/96

Foreign Patent or Published Foreign Patent Application

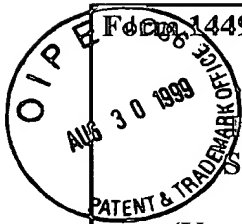
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							Yes	No
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
✓	R	A. Michael Noll, "Man-Machine Tactile Communication", Polytechnic Institute of Brooklyn, 1971.
✓	S	Ming Ouh-Young, "Force Display in Molecular Docking", University of North Carolina at Chapel Hill, 1990.
✓	T	Meyer, et al., "A Survey of Position Trackers", University of North Carolina, Presence, Volume 1, Number 2, Spring 1992.
Examiner: <i>Kenneth M. Martin</i>		Date Considered: <i>12/15/99</i>

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Group 2837

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
1	A	5,721,566	02/24/98	Rosenberg et al.	345	161	06/09/95
	B	5,731,804	03/24/98	Rosenberg	345	156	01/18/95
	C	5,734,373	03/31/98	Rosenberg et al.	345	161	12/01/95
	D	5,742,278	04/21/98	Chen et al.	345	156	11/1/95
	E	5,754,023	05/19/98	Roston et al.	318	561	10/22/96
	F	5,767,839	06/16/98	Rosenberg	345	161	03/03/95
	G	5,769,640	06/23/98	Jacobus et al.	434	262	08/10/95
	H	5,790,108	08/04/98	Salcudean et al.	345	184	10/23/92
	I	5,802,353	09/01/98	Avila et al.	395	500	06/12/96
	J	5,805,140	09/08/98	Rosenberg et al.	345	161	11/17/95
	K	5,844,392	12/01/98	Peurach et al.	318	568.17	05/21/97

Foreign Patent or Published Foreign Patent Application

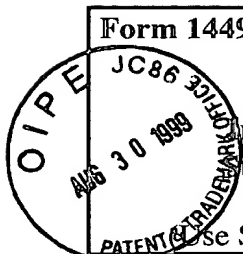
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							Yes	No
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
1	R	Immersion PROBE-MD, "High Performance Model of the Immersion Probe:", Immersion Corporation, P.O. Box 8669, Palo Alto, CA 94309-8669.
	S	Geoffrey Smith, "Call It Palpable Progress", Science & Technology, Business Week, October 9, 1995, pg. 93.
	T	D.S. Tavkhelidze, et al., "Kinematic Analysis of Five-Link Spherical Mechanisms", Mechanism and Machine Theory, Pergamon Press, 1974, Vol.9, pp. 181-190.
Examiner: <i>Kenneth M. Martin</i>		Date Considered: <i>12/15/97</i>

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U.S. Patent Documents

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12	A	5,872,438	02/16/99	Roston	318	568.11	07/01/97
12	B	5,889,670	03/30/99	Schuler et al.	364	186	01/11/96
	C						
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Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
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12	R	S.C. Jacobsen, et al., "High Performance, High Dexterity, Force Reflective Teleoperator II", ANS Topical Meeting on Robotics and Remote Systems, Albuquerque, New Mexico, February 24-27, 1991.
12	S	Buttolo, et al., "Pen-Based Force Display for Precision Manipulation in Virtual Environments", Biorobotics Laboratory, Dept. of Electrical Engineering, Univ. of Washington, Seattle, Proc. IEEE Virtual Reality Annual International Symposium, March, 1995, pp. 217-224.
12	T	Immersion Corp., "The Personal Digitizer", High Performance Digitizing for Your Desktop.
Examiner <i>Kenneth Martin</i>		Date Considered <i>12/15/99</i>

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U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
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Foreign Patent or Published Foreign Patent Application

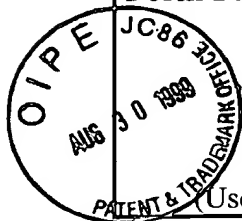
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
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	M							
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Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>1.0</i>	R	Fischer, et al., "Specification and Design of Input Devices for Teleoperation", Robotics Research Group, Dept. of Engineering Science, Univ. of Oxford, KV Siva, Engineering Science Division, AEA Technology, Harwell UK.
<i>1.1</i>	S	Young, et al., "Force Display Performs Better Than Visual Display in a Simple 6-D Docking Task", Computer Science Department, University of North Carolina at Chapel Hill, IEEE 1989.
<i>1.2</i>	T	Bejczy, et al., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay", JPL, California Institute of Technology, IEEE 1990.
Examiner	Date Considered	
<i>Kenneth Martin</i>	<i>12/15/99</i>	

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Form 1449 (Modified)

Information Disclosure
Statement By Applicant

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Atty Docket No.:
IMM1P021ASerial No.:
09/106,565

Applicant: Kenneth M. Martin et al.

Filing Date: 6/29/98

Group 2837

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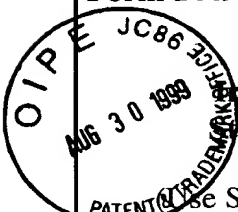
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
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<i>ja</i>	S	Kilpatrick, Paul Jerome, "The Use of a Kinesthetic Supplement in an Interactive Graphics System", Xerox University Microfilms, Ann Arbor, Michigan, 1976.
<i>ja</i>	T	Kelley, A. et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface using an Electromagnetically Actuated Input/Output Device," Dept. of Electrical Engineering, Univ. of British Columbia, 1993, pp. 1-27.
Examiner	Date Considered	
<i>Kenn Martin</i>	<i>12/15/97</i>	

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Form 1449 (Modified)  Information Disclosure Statement By Applicant (2)	Atty Docket No.: IMM1P021A	Serial No.: 09/106,565
	Applicant: Kenneth M. Martin et al.	
	Filing Date: 6/29/98	Group 2837

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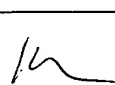
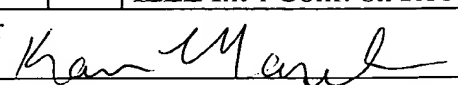
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	R	Salcudean, S.E., "A Six Degree-of-Freedom, Hydraulic, One Person Motion Simulator," Dept. of Electrical Engineering, Univ. of British Columbia, 1993.
	S	Hayward, V. et al., "Design and Multi-Objective Optimization of a Linkage for a Haptic Interface," Advances in Robot Kinematics and Computationed Geometry, Kluwer Academic Publishers, 1994, pp. 359-368.
	T	Millman, P. et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum with a Specified Force/Torque Workspace," Proc. of 1991 IEEE Int'l Conf. on Robotics and Automation, IEEE 1991, pp. 1488-1492.
Examiner: 		Date Considered: 12/15/98

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Information Disclosure Statement By Applicant

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Atty Docket No.: IMM1P021A Serial No.: 09/106,565

Applicant: Kenneth M. Martin et al.

Filing Date: 6/29/98 Group 2837

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U.S. Patent Documents

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	M							
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	O							
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
<i>lh</i>	R	Brooks Jr., F., "Project GROPE—Haptic Displays for Scientific Visualization," Computer Graphics, Vol. 24, No. 4, 1990, pp. 177-185.
<i>lh</i>	S	Hannaford, B. et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, 1989, pp. 1-4.
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Examiner <i>Kenn Martin</i>		Date Considered <i>12/18/99</i>

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